

Inner Triplet- Heat eXchanger Test Unit

Technical memo: 04-14-00 - Draft

Proposal for the HX tube deflection measurement

Goal

Parameterization of the HX tube straightness. Validate the need of adding extra supports in order to get a deflection lower than 10-mm.

Parts into focus

Corrugated HX tube + tube connectors.

For information on the assembly: see dwg 364064.

Functional dimensions:

Tube 1 female:

#364135

Inner D = 84.58 mm

Outer D = 88.9 mm

Length = 31 mm

HX tube:#364063

Inner D = 96.1 mm

Outer D = 97.5 mm

Length = 7450 mm

Tube 2 male:#364134

Inner D = 78.2 mm

Outer D = 84.1 mm

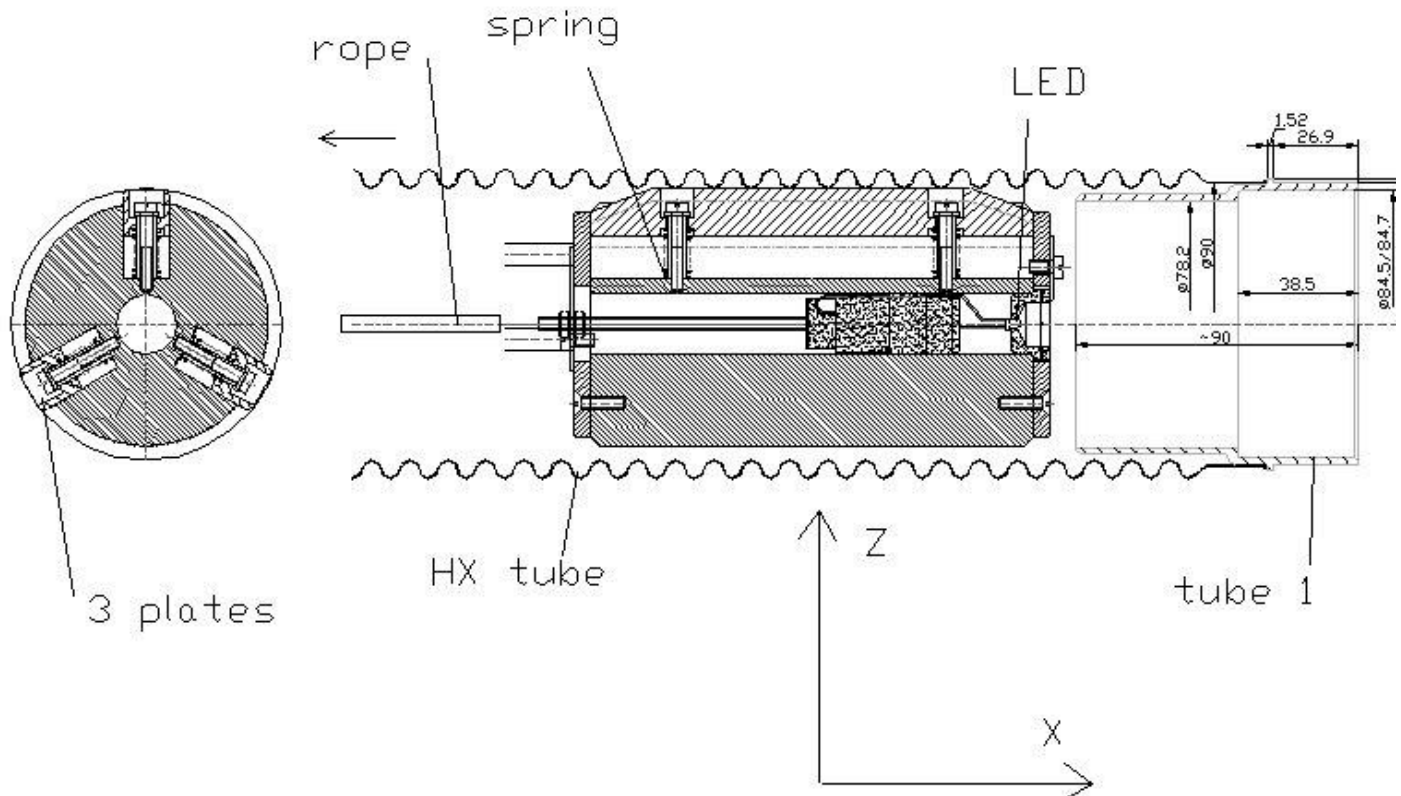
Length = 28 mm

Submarine = support the LED

Design of the system:

Distance from the LED to the hanger of the rope = 185mm.

Three retractable plates, 1, permit to access and stabilize the Submarine inside the HX tube.



Process

General description

The tool used for measurements (the submarine) will be inserted through an extremity of the HX tube and up to the second extremity. Measurement of the "dz" and "dy" will be taken every 10-cm according to a reference point. Data acquisition system will be provided. Once the submarine is located in the HX tube it will be rotated along the X-axis in order to get the error of the measurement.

Preparation

In order to simulate the connection to the next HX tube, the extremities of the HX tube will be supported by two composite plates (design as 364060) for the case of Step 1 and 2.

The final welding of each HX tube will induce some stress that will straighten the HX tube. In order to get a conservative measurement, we will first measure the deflection, without applying any pre-stress (pulling the extremities). Then some measurements will be performed in order to estimate the influence of the pre-stress.

Step 1:

Measurement of the 7-m HX tube on a 0% slope for modules US-LHC003

The module will be located on two 80-cm stone blocs.

Locate the Submarine in the HX tube, (side instrumentation port flange (X=0)).

Record dz and dy for X=0.

Repeat #4, for X=10cm , 20cm... pulling the submarine up to the other extremity.

Repeat from action #2 with module US-LHC004.

Step 2:

Measurement of the 7-m HX tube on a 1.4% slope for modules US-LHC003.

The module will be located on their dedicated supports.

The theodolite will be installed on the side of the FB, referring the US-LHC003 HX tube extremity as the reference point.

Locate the Submarine in the HX tube, (US-LHC003: side instrumentation port flange (X=0)).

Record dz and dy for X=0

Repeat #4, for X=10cm , 20cm... pulling the submarine up to the other extremity of US-LHC003.

Repeat from action #4 with module US-LHC004.

Step 3:

Measurement of the HX tube deflection, on a 1.4% slope for modules US-LHC003 and 004 once they are connected together.

The modules will be located on their dedicated supports.

The theodolite is installed on the side of the FB, referring the US-LHC003 HX tube extremity as the reference point.

Locate the Submarine in the HX tube, (US-LHC003: side instrumentation port flange (X=0)).

Record dz and dy for X=0

Repeat #4, for X=10cm , 20cm... up to the exit of US-LHC004